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ABSTRACT

To evaluate the effectiveness of a traditional college English program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year; another 100 (Group B) were asked to postpone the first term to their sophomore year; another 100 (Group C) were asked to postpone their second term to the sophomore year; and another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading test and a language-knowledge test devised by the staff. The data collected were subjected to analysis of variance. Results were: (1) Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material; (2) No differences were noted between the experimental and control groups on the other measures applied; and (3) Women did better than men on all tests. It was concluded that the philosophy, content, and teaching methods of the freshman English sequence need to be reexamined and reevaluated. (Author/CK)

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The Wisconsin State Universities Consortium of Research Development

Research Report

AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN ENGLISH AT WISCONSIN STATE UNIVERSITY - RIVER FALLS

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Cooperative Research

Wisconsin State Universities
and the
United States Office of Education
Bureau of Research - Higher Education

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AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN ENGLISH AT WISCONSIN STATE UNIVERSITY-RIVER FALLS

Investigator: Robert H. Beck
Wisconsin State University-River Falls
Local Project No. 1

SUMMARY

Since it was reorganized in 1946, Freshman English at WSU-River Falls has tended to emphasize the traditional goals of the effective use of written language, the reading of English with ease and competence, the interpretation and evaluation of the written and spoken language and an examination of language in terms of its function.

To evaluate the effectiveness of the program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year, another 100 (Group B) were asked to postpone the first term to their sophomore year, another 100 (Group C) were asked to postpone their second term to the sophomore year, another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading Test and a language-knowledge test devised by the staff.

The data collected in the above manner were subjected to analysis of variance with the following general results:

1. Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material.

2. No differences were noted between the experimental groups and the control groups on the other measures applied.

3. Women did better than men on all tests.

Based on the evidence from this study, the philosophy, content and teaching methods of the Freshman English sequence need to be re-examined and re-evaluated.

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FINAL REPORT

WSU-CORD
The Consortium of Research Development
Of The
Wisconsin State Universities

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Introduction

Since 1946, Freshman English at Wisconsin State University - River Falls has evolved as a part of the general education program in the University and has been strongly oriented to intellectual content as well as to the traditional skills. The course has increasingly concentrated on the relationships of language to man's culture and personality, with special attention given to the language of the student's environment. For instance, in the first quarter, which is concerned with the nature of language, the student is introduced through the study of the history of English to the concept that language changes with culture; he learns through a contrast between "traditional" grammar and modern grammar that language has arbitrary form as well as lexical content; he learns through semantics that words and the things that words are "about" are not identical, and through a study of logic that statements have certain relationships to each other in meaningful speech and writing. In the second quarter, the student investigates the relationships between his culture and the language around him with attention to social and regional dialects, to the mass media, to advertising, to the language of politics, and to the language of social control. In the third quarter, the student works with language as a consciously refined and traditional instrument of art in the various genres of literature, not only to "admire" great literature but to gain some of its power of utterance for himself.

The course aims to achieve the following broad and traditional goals:

1. To develop art and ease in the use of written English
2. To read English of a scholarly style with relative ease and competence.
3. To interpret and evaluate written and spoken language with conscious standards.
4. To react appropriately to language in terms of its function.

The English staff was aware that no reliable measurement has ever been made on this campus of what is the achievement of its students who take the course and in the same manner there has been no measure of the

impact of the various quarters of the course on reaching the final objectives.

The following general hypothesis was offered for testing: nine quarter hours of Freshman English as now taught will produce greater achievement of course objectives than six quarter hours or no quarter hours of Freshman English. The English department was principally concerned with testing whether the intellectual content of its present course did contribute noticeably to achievement of its objectives or whether the students' gains in language maturity and usage came about through sheer passage of time. Does, for example, the reading in Freshman English noticeably help the student's comprehension or might he be gaining the same comprehension by reading a history textbook? Subjectively, we have all seen improvement in our students as the shcool year passed, but objectively, did we know that what we did in Freshman English was an effective factor? Or is the most important thing that happens to a student is that he simply becomes a year older in the college environment?

Dr. Robert Pooley in Teaching English Grammar (1957) and Dr. R. D. Williams in The Teaching of English in Wisconsin (1948) has made us aware that the teaching of traditional grammar alone has probably very little impact on compositional skills--and a survey of such materials as Henry C. Meckel's "Research on Teaching Composition and Literature" in Handbook of Research on Teaching (1963) and R. Braddock, R. Lloyd-Jones, and L. Schoer's Research in Written Composition (1963) has made us aware of the variables in English courses which have been tested in the past. The latter book was found to be most useful despite its modest length; copies were soon acquired for all Freshman English staff members for reading and discussion.

Methods

The procedures and design used in this investigation were based on the following experimental questions:

1. As measured by the evaluative criteria, what was the contribution of English 111 (fall quarter), English 112 (winter quarter), and English 113 (spring quarter)?

2. As measured by the evaluative criteria, what was the difference in impact among English 111, 112, and 113?

In setting up the design of the investigation, the following assumptions were made:

1. The number of available and eligible Freshmen for the fall of 1967 would be approximately 1,000.

2. The random assignment of subjects to the various subgroups would rule out the necessity for any type of pretest and matching.

The experimental design can best be described in the following tabular format:

Table 1

The Experimental Design

Group	Approximate Number	Per Cent of Total	Treatment
A	100	10	Postpone all English to Sophomore year
B	100	10	Postpone English 111 to Sophomore year
C	100	10	Postpone English 112 to Sophomore year
D	100	100	Postpone Enlgish 113 to Sophomre year
E	600	60	Take English 111, 112, 113 in Freshman year.

At the end of the academic year 244 randomly selected Freshmen were given the following examinations:

1. A writing proficiency examination rated by five readers on six criteria. This resulted in a 7-point rating scale with numerical scores ranging from 7 to 42.

2. The Brown-Carlson Listening Test.

3. The Iowa Reading Test.

4. A language-knowledge test devised by the staff.

These tests were administered by ten pre-trained staff members to the students on the 18th and 20th of May, 1968, in two 2-hour sessions. Clerical help was utilized to grade the Brown-Carlson, the Iowa Reading and the language-knowledge tests. The writing proficiency examination, numbered for individual student identification instead of names to preserve anonymity and rater bias were graded by five English teachers pre-trained by a method used at the University of Iowa to attain agreement on grading methods.

Clerical help was then used to ready the test scores and other background data on each student for the analysis in the Computer Center. Because of incomplete data, twelve subjects were removed from the pool leaving a group of 232 on whom the final analysis was made.

The data were then subjected to an analysis of variance testing equality of:

1. The various sequence pattern groups
2. Sexes
3. Size of high school class of origin
4. Occupational backgrounds of parents
5. Intended majors
6. State vocational professional plans

Findings

The data collected in this study were subjected to an analysis of variance testing equality of: (1) the various sequence pattern groups; (2) sexes; (3) size of high school class of origin; (4) occupational backgrounds of parents; (5) intended majors; and (6) stated vocational-professional plans. Appendix A, pages 7 -34, contains a summary of the analysis.

On the test of equality over the basic Freshman English groups, no differences were observed on the reading, writing and listening tests. On the test over Freshman English content, the null-hypothesis was rejected at the five per cent level. Group A, those who had not taken any part of the Freshman English sequence, scored low as compared with the other groups. Group D, those not taking English 113, and Group E, those taking the complete sequence, scored high.

On all four tests, women scored significantly higher than men. On the writing, listening, and the content test, this difference was significant at the one per cent level. On the reading test, this sex difference was significant at the five per cent level.

When student groups were compared in terms of the size of the high school from which they had graduated, no differences were observed on any of the four tests. The same statement can be made regarding the occupational backgrounds of the students.

When students were classified by major, no differences were observed on the reading tests and the writing tests. On the listening test. the hypothesis of equality was rejected at the five per cent level, with agriculture majors scoring low. On the content test, agriculture majors and unclassified students scored low, while biology, chemistry, mathematics, physics, business administration, and social science majors scored high. These differences were significant at the one per cent level.

When students were grouped by their vocational-professional plans, no differences were observed on the reading, listening and content tests. On the writing test, students planning careers in the professions, private business, government or as self-employed scored high, while those planning careers in travel or as housewives, or were undecided scored low This difference was significant at the one per cent level.

At no point in the analysis was a significant inter-reaction observed.

Conclusions and Recommendations

The results of this experiment will have a profound effect on the nature and direction of the current Freshman English program. In summary, the uses to be made of the findings of our study are the following:

1. That on the basis of the various results of our experiment, we revise our syllabus content to meet our announced objectives in Freshman English.

2. That on the basis of our new knowledge of our students' backgrounds, we revise our syllabus content and teaching methods.

3. That on the basis of an analysis of variables in our students' background, we begin to use some predictions for those who might profitably be excused from Freshman English in order to reduce class size or reduce staff need.

4. That self-education for the Freshman English staff in English education continue.

5. And, that a foundation of material and experience be laid upon which to build further testing and refining of the Freshman English curriculum.

We are up against something very complex, involving the nature of gaining language maturity, the pedagogy of Freshman English, the nature of the teachers and students, the interaction of general compus culture and formal studies in the classroom, and discovering and isolating what it is possible to teach in the use of language. We have a hunch that more of the same kinds of work (increased writing, reading, working harder) is not the best to get at the problem, although for this year, that is the immediate direction of revision. We are ending up with more questions than when we started.

During the 1968-69 academic year, the various members of the Freshman English staff will be involved in a series of group sessions in an attempt to interpret the results of the experiment, to devise further ways and means of testing educational assumptions and the educational results. It is hoped that these may be applied during the 1969-70 academic year.

APPENDIX A

TABLE I

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE IOWA READING TEST

	Group A		Group B		Group C		Group D		Group E	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	18	15	17	13	16	50	44
Sums	4,215	3,028	3,702	3,368	2,772	3,164	2,379	3,080	9,150	8,171
SS	776,615	574,748	687,890	631,566	514,706	592,314	436,661	594,802	1,682,398	1,525,073
$\bar{X}$	183.26	189.25	185.10	187.11	184.80	186.11	183.00	192.50	183.00	185.70
ss	4,170.435	1,699.000	2,649.800	1,375.778	2,440.400	3,437.765	1,304.000	1,902.000	7,948.000	7,681.159

SUMMARY OF THE ANALYSIS OF VARIANCE OF THE IOWA READING TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Between groups	4	237.161	59.290				Accepted
Between sexes	1	891.168	891.168	5.716	3.89	6.76	Rejected
Interaction	4	449.166	112.291				Accepted
Within	222	34,608.337	155.893				

TABLE II

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE WRITING PROFICIENCY EXAMINATION

	Group A		Group B		Group C		Group D		Group E	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	18	15	17	13	16	50	44
Sums	1,467	1,155	1,239	1,372	926	1,316	803	1,260	3,193	3,467
SS	97,827	84,845	83,395	106,358	60,098	103,516	52,307	102,598	212,975	282,659
$\overline{X}$	63.78	72.18	61.95	76.22	61.73	77.41	61.76	78.75	63.86	78.79
ss	4,257.913	1,468.437	6,638.950	1,781.111	2,932.933	1,642.118	2,706.308	3,373.000	9,070.020	9,475.159

SUMMARY OF ANALYSIS OF VARIANCE OF THE WRITING PROFICIENCY EXAMINATION SCORES

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Between groups	4	242.149	60.537				Accepted
Between sexes	1	9,510.851	9,510.851	48.710	3.89	6.76	Rejected
Interaction	4	424.069	106.017				Accepted
Within	222	43,345.949	195.252				Accepted

TABLE III

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE BROWN-CARLSON LISTENING COMPREHENSION TEST

	Group A		Group B		Group C		Group D		Group E	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	18	15	17	13	16	50	44
Sums	1,183	904	1,073	991	791	929	695	925	2,626	2,344
SS	61,551	51,772	58,713	55,195	42,191	51,531	37,559	53,843	140,804	126,186
$\bar{X}$	51.43	56.50	53.65	55.05	52.73	54.64	53.46	57.81	52.52	53.27
ss	703.652	696.000	1,146.550	634.944	478.933	763.882	403.231	366.437	2,886.480	1,314.727

SUMMARY OF ANALYSIS OF VARIANCE OF THE BROWN-CARLSON LISTENING COMPREHENSION TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Between groups	4	156.438	39.109				Accepted
Between sexes	1	349.992	349.992	8.270	3.89	6.76	Rejected
Interaction	4	139.218	34.804				Accepted
Within	222	9,394.836	42.319				

TABLE IV

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LANGUAGE KNOWLEDGE TEST

	Group A		Group B		Group C		Group D		Group E	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	18	15	17	13	16	50	44
Sums	675	470	611	596	458	593	418	564	1,561	1,562
SS	20,503	14,506	19,593	20,748	14,306	21,591	13,790	20,400	51,635	57,498
$\bar{X}$	29.34	29.37	30.55	33.11	30.53	34.88	32.15	35.25	31.22	35.50
ss	693.217	699.750	926.950	1,013.778	321.733	905.765	349.692	519.000	2,900.580	2,047.000

SUMMARY OF ANALYSIS OF VARIANCE OF THE LANGUAGE KNOWLEDGE TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Between groups	4	465.384	116.346	2.488	2.41	3.41	Rejected
Between sexes	1	394.966	394.966	8.449	3.89	6.76	Rejected
Interaction	4	119.360	29.840				Accepted
Within	222	10,377.465	46.745				

TABLE V

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE IOWA READING TEST WHEN CLASSIFIED BY SIZE OF HIGH SCHOOL ORIGIN

Size of High School Origin		Group A	Group B	Group C	Group D	Group E
0 - 199	N	25	29	21	21	61
	Sums	4,679	5,382	3,921	3,946	11,149
	SS	880,269	1,001,746	736,187	744.104	2,047,165
	$\bar{X}$	187.16	185.58	186.71	187.90	182.77
	ss	4,547.260	2,921.034	4,080.286	2,631.810	9,456.787
200 - 399	N	7	4	2	5	18
	Sums	1,288	743	395	972	3,391
	SS	237,868	138,167	78,017	189,698	642,127
	$\bar{X}$	184.00	185.75	197.50	194.40	188.38
	ss	876.000	154.750	4.500	741.200	3,300.278
400 or more	N	7	5	9	3	15
	Sums	1,276	945	1,620	541	2,781
	SS	233,226	179,543	291,816	97,661	518,179
	$\bar{X}$	182.29	189.00	180.00	180.33	185.40
	ss	629.429	938.000	216.000	100.667	2,581.600

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
H.S. Size of Origin	2	757.449	378.724	2.476	3.04	4.71	Accepted
Groups	4	178.094	44.523				Accepted
Interaction	8	1,233.418	154.177	1.008	1.98	2.60	Accepted
Within	217	33,179.601	152.901				

TABLE VI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY SIZE OF HIGH SCHOOL OF ORIGIN

Size of High School Origin		Group A	Group B	Group C	Group D	Group E
0 - 199	N	25	29	21	21	61
	Sums	1,715	2,014	1,472	1,488	4,319
	SS	121,003	148,502	107,842	110,166	321,913
	$\bar{X}$	68.60	69.44	70.09	70.85	70.80
	ss	3,354.000	8,633.172	4,661.810	4,730.581	16,113.639
200 - 399	N	7	4	2	5	18
	Sums	441	279	168	409	1,267
	SS	30,185	19,833	14,504	35,409	93,535
	$\bar{X}$	63.00	69.75	84.00	81.80	70.38
	ss	2,402.000	372.750	392.000	1,952.800	4,352.278
400 or more	N	7	5	9	3	15
	Sums	466	318	602	166	1,074
	SS	31,484	21,418	41,268	9,330	80,186
	$\bar{X}$	66.57	63.60	66.89	55.33	71.60
	ss	461.715	1,193.200	1,000.889	144.667	3,287.600

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
H.S. Size of Origin	2	1,394.316	697.158	2.851	3.04	4.71	Accepted
Groups	4	716.579	179.145				Accepted
Interaction	8	2,444.993	305.624	1,250	1.98	2.60	Accepted
Within	217	53,053.091	244.484				

TABLE VII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY SIZE OF HIGH SCHOOL ORIGIN

Size of High School Origin		Group A	Group B	Group C	Group D	Group E
0 - 199	N	25	29	21	21	61
	Sums	1,322	1,578	1,148	1,185	3,228
	$SS_{\bar{X}}$	71,252	87,180	63,486	67,577	173,038
	$\bar{X}$	52.88	54.41	54.66	56.42	52.91
	ss	1,344.640	1,315.034	728.667	709.143	2,218.590
200 - 399	N	7	4	2	2	18
	Sums	373	215	118	80	942
	$SS_{\bar{X}}$	20,011	11,611	6,964	3,328	50,520
	$\bar{X}$	53.28	53.75	59.00	40.00	52.33
	ss	135.429	54.750	2.000	128.000	1,222.000
400 or more	N	7	5	9	3	15
	Sums	392	271	454	155	800
	$SS_{\bar{X}}$	22,060	15,117	23,272	8,059	43,432
	$\bar{X}$	56.00	54.20	50.44	51.67	53.33
	ss	108.000	428.800	370.222	50.667	765.333

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
H.S. Size of Origin	2	53.612	26.806				Accepted
Groups	4	46.539	11.634				Accepted
Interaction	8	336.826	42.103				Accepted
Within	217	9,539.275	43.959				

TABLE VIII

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY SIZE OF HIGH SCHOOL OF ORIGIN

Size of High School Origin		Group A	Group B	Group C	Group D	Group E
0 - 199	N	25	29	21	21	61
	Sums	710	898	704	700	2,006
	SS	20,862	29,550	24,540	24,094	69,190
	$\overline{X}$	28.40	30.96	33.52	33.33	32.88
	ss	698.000	1,742.966	939.238	760.667	3,222.197
200 - 399	N	7	4	2	5	18
	Sums	214	133	80	179	635
	SS	6,930	4,521	3,328	6,511	23,431
	$\overline{X}$	30.57	33.25	40.00	35.80	35.27
	ss	387.714	98.750	128.000	102.800	1,029.611
400 or more	N	7	5	9	3	15
	Sums	221	176	267	103	482
	SS	7,217	6,270	8,029	3,585	16,512
	$\overline{X}$	31.57	35.20	29.67	34.33	32.13
	ss	239.714	74.800	108.000	48.667	1,023.733

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
H.S. Size of Origin	2	186.395	93.197	1.907	3.04	4.71	Accepted
Groups	4	251.590	62.897	1.287	2.41	3.41	Accepted
Interaction	8	342.960	42.870				Accepted
Within	217	10,604.857	48.870				

TABLE IX

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE IOWA READING TESTS WHEN CLASSIFIED BY FATHER'S OCCUPATION

Father;s Occupation		Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N	9	15	14	11	25
	Sums	1,677	2,775	2,613	2,051	4,641
	SS	313,181	515,431	489,671	384,005	864,133
	$\overline{X}$	186.33	185.00	186.64	186.45	185.64
	ss	700.000	2,056.000	1,973.214	1,586.727	2,577.760
Group 2 - Mechanical	N	5	6	2	9	16
	Sums	947	1,102	378	1,669	2,930
	SS	179,731	202,932	71,642	310,323	539,206
	$\overline{X}$	189.40	183.66	189.00	185.44	183.12
	ss	369.200	531.333	200.000	816.222	2,649.750
Group 3 - Professional	N	8	4	2	3	13
	Sums	1,522	765	360	557	2,479
	SS	290,134	146,555	65,250	103,697	473,385
	$\overline{X}$	190.25	191.25	180.00	185.66	190.69
	ss	573.500	248.750	450.000	280.667	658.769
Group 4 - Services	N	5	6	7	5	12
	Sums	938	1,138	1,303	990	2,262
	SS	177,238	216,280	243,745	196,204	428,196
	$\overline{X}$	187.60	189.66	186.14	198.00	188.50
	ss	1,269.200	439.333	1,200.857	184.000	1,809.000
Group 5 - Miscellaneous	N	8	6	4	9	28
	Sums	1,409	1,097	744	1,673	5,009
	SS	250,211	201,009	139,650	312,413	902.551
	$\overline{X}$	176.12	182.83	186.00	185.89	178.89
	ss	2,050.875	440.833	1,266.000	1,420.889	6,476.679

TABLE IX A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Occupations	4	1,021.632	255.408	1.640	2.41	3.41	Accepted
Groups	4	165.080	41.270				Accepted
Interaction	16	1,571.914	98.244				Accepted
Within	207	32,229.540	155.698				

TABLE X

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY FATHER'S OCCUPATION

Father's Occupation		Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N	9	15	14	11	25
	Sums	586	968	1,026	770	1,803
	SS	39,320	68,442	76,650	55,296	136,049
	$\bar{X}$	65.11	64.53	73.28	70.00	72.12
	ss	1,164.889	5,973.733	1,458.857	1,396.000	6,016.640
Group 2 - Mechanical	N	5	6	2	9	16
	Sums	333	403	150	620	1,080
	SS	22,681	28,255	11,492	44,708	77,188
	$\bar{X}$	66.60	67.16	75.00	68.88	67.50
	ss	503.200	1,186.833	242.000	1,996.889	4,288.000
Group 3 - Professional	N	8	4	2	3	13
	Sums	511	317	173	178	937
	SS	34,597	25,389	15,005	11,220	69,917
	$\bar{X}$	63.87	79.25	86.50	59.33	72.07
	ss	1,956.875	266.750	40.500	658.667	2,380.923
Group 4 - Services	N	5	6	7	5	12
	Sums	330	405	408	409	820
	SS	22,196	27,615	26,032	34,453	58,940
	$\bar{X}$	66.00	67.50	58.28	81.80	68.33
	ss	416.000	277.500	2,251.429	996.800	2,906.667
Group 5 - Miscellaneous	N	8	6	4	9	28
	Sums	588	456	253	654	2,020
	SS	44,840	36,208	16,251	50,292	153,540
	$\bar{X}$	73.50	76.00	63.25	72.67	72.14
	ss	1,622.000	1,552.000	248.750	2,768.000	7,811.429

TABLE X A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Occupations	4	348.909	87.227				Accepted
Groups	4	350.963	87.740				Accepted
Interaction	16	5,521.187	345.074	1.417	1.69	2.09	Accepted
Within	207	50,381.331	243.388				

TABLE XI

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY FATHER'S OCCUPATION

Father's Occupation		Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N	9	15	14	11	25
	Sums	450	817	769	599	1,342
	SS	22,964	45,265	42,943	32,975	72,956
	$\bar{X}$	50.00	54.46	54.92	54.45	53.68
	ss	464.000	765.733	702.929	356.727	917.440
Group 2 - Mechanical	N	5	6	2	9	16
	Sums	289	309	116	495	823
	SS	16,849	16,023	6,730	27,685	43,815
	$\bar{X}$	57.80	51.50	58.00	55.00	51.43
	ss	144.800	109.500	2.000	460.000	1,481.937
Group 3 - Professional	N	8	4	2	3	13
	Sums	413	227	112	186	680
	SS	21,537	13,127	6,322	11,558	35,888
	$\bar{X}$	51.62	56.75	56.00	62.00	52.30
	ss	215.875	244.750	50.000	26.000	318.769
Group 4 - Service	N	5	6	7	5	12
	Sums	263	323	371	296	659
	SS	14,071	17,495	19,747	17,598	36,483
	$\bar{X}$	52.60	53.83	53.00	59.20	54.91
	ss	237.200	106.833	84.000	74.800	292.917
Group 5 - Miscellaneous	N	8	6	4	9	28
	Sums	443	322	213	478	1,466
	SS	24,707	17,642	11,505	25,612	77,848
	$\bar{X}$	55.37	53.67	53.25	53.11	52.36
	ss	175.875	361.333	162.750	224.889	1,092.429

TABLE XI A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Occupations	4	104.731	26.182				Accepted
Groups	4	270.003	67.500	1.539	2.41	3.41	Accepted
Interaction	16	685.931	42.870				Accepted
Within	207	9,073.486	43.833				

TABLE XII

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY FATHER'S OCCUPATION

Father's Occupation		Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N	9	15	14	11	25
	Sums	251	493	491	375	827
	SS	7,267	17,443	17,967	13,019	28,549
	$\bar{X}$	27.88	32.86	35.07	34.09	33.08
	ss	266.889	1,239.733	746.929	234.909	1,191.840
Group 2 - Mechanical	N	5	6	2	9	16
	Sums	151	166	77	301	523
	SS	4,663	4,806	3,025	10,515	17,981
	$\bar{X}$	30.20	27.66	38.50	33.44	32.68
	ss	102.800	213.333	60.500	448.222	885.438
Group 3 - Professional	N	8	4	2	3	13
	Sums	260	126	67	112	438
	SS	8,746	4,070	2,285	4,320	14,934
	$\bar{X}$	32.50	31.50	33.50	37.33	33.69
	ss	296.000	101.000	40.500	138.667	176.769
Group 4 - Services	N	5	6	7	5	12
	Sums	128	183	205	175	421
	SS	3,368	5,667	6,161	6,199	15,589
	$\bar{X}$	25.60	30.50	29.28	35.00	35.08
	ss	91.200	85.500	157.429	74.000	818.917
Group 5 - Miscellaneous	N	8	6	4	9	28
	Sums	227	199	123	275	914
	SS	6,657	6,755	3,843	8,661	32,080
	$\bar{X}$	28.37	33.17	30.75	30.56	32.64
	ss	215.875	154.833	60.750	258.222	2,244.429

TABLE XII A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Occupations	4	147.734	36.933				Accepted
Groups	4	552.694	138.173	2.775	2.41	3.41	Rejected
Interaction	16	614.768	38.423				Accepted
Within	207	10,304.682	49.781				

TABLE XIII

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE IOWA READING TESTS WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings		Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N	8	9	4	3	10
	Sums	1,468	1,707	750	587	1,872
	SS	271,870	324,609	140,814	114,937	350,996
	$\bar{X}$	183.50	189.66	187.50	195.66	187.20
	ss	2,492.000	848.000	189.000	80.667	557.600
Social Sciences & Business Administration	N	6	4	6	2	19
	Sums	1,102	781	1,108	388	3,453
	SS	203,216	152.763	206.082	75,370	631,265
	$\bar{X}$	183.66	195.25	184.66	194.00	181.73
	ss	815,333	272.750	1,471.333	98.000	3,727.684
Humanities	N	11	5	9	8	22
	Sums	2,117	918	1,656	1,495	4,024
	SS	408,589	168,720	306,426	280,469	739,186
	$\bar{X}$	192.45	183.60	184.00	186.87	182.90
	ss	1,162.727	178.200	1,722.000	1,090.875	3,159.818
Agriculture	N	2	6	4	8	6
	Sums	338	1,085	765	1,437	1,129
	SS	57,140	197,039	146,397	258,579	212.715
	$\bar{X}$	169.00	180.83	191.25	179.62	188.16
	ss	18.000	834.833	90.750	457.875	274.833
Unclassified	N	5	6	3	2	11
	Sums	928	1,061	581	394	1,990
	SS	172,482	188,075	113,531	77,618	362,052
	$\bar{X}$	185.60	176.83	193.66	197.00	180.90
	ss	245.200	454.833	1,010.667	0.000	2,042.909
Miscellaneous	N	7	7	6	7	26
	Sums	1,290	1,325	1,076	1,351	4,853
	SS	238,066	251,001	193,770	261,739	911,257
	$\bar{X}$	184.28	189.28	179.33	193.00	186.65
	ss	337.429	197.429	807.333	996.000	5,425.885

TABLE XIII A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Major Groupings	5	758.113	151.622				
Groups	4	1,123.157	280.789	1.826	2.41	3.41	Accepted
Interaction	20	4,042.944	202.147	1.314	1.62	1.97	Accepted
Within	202	31,059.963	153.762				Accepted

TABLE XIV

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings		Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N	8	9	4	3	10
	Sums	600	628	272	248	763
	SS	45,410	45,720	18,730	21,536	59,047
	$\bar{X}$	75.00	69.77	68.00	82.66	76.30
	ss	410.000	1,899.556	234.000	1,034.667	830.100
Social Sciences & Business Administration	N	6	4	6	2	19
	Sums	390	286	403	164	1,296
	SS	26,080	21,898	28,883	13,466	94,564
	$\bar{X}$	65.00	71.50	67.16	82.00	68.21
	ss	730.00	1,449.000	1,814.833	18.000	6,163.158
Humanities	N	11	5	9	8	22
	Sums	796	358	669	572	1,513
	SS	59,388	26,254	51,175	42,020	109,193
	$\bar{X}$	72.36	71.60	74.33	71.50	68.77
	ss	1,786.545	621.200	1,446.000	1,122.000	5,139.864
Agriculture	N	2	6	4	8	6
	Sums	112	328	271	497	393
	SS	6,322	20,036	20,227	32,527	27,707
	$\bar{X}$	56.00	54.66	67.75	62.12	65.50
	ss	50.000	2,105.333	1,866.750	1,650.875	1,965.500
Unclassified	N	5	6	3	2	11
	Sums	304	409	215	168	745
	SS	19,004	29,875	16,093	14,400	53,153
	$\bar{X}$	60.80	68.16	71.66	84.00	67.72
	ss	520.800	1,994.833	684.667	288.000	2,696.182
Miscellaneous	N	7	7	6	7	26
	Sums	420	540	412	476	1,950
	SS	26,468	42,126	28,506	34,800	151,970
	$\bar{X}$	60.00	77.14	68.67	68.00	75.00
	ss	1,268.000	468.857	215.333	2,432.000	5,720.000

TABLE XIV A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Major Groupings	5	2,591.704	518.340	2.153	2.26	3.11	Accepted
Groups	4	1,660.092	415.023	1.724	2.41	3.41	Accepted
Interaction	20	477.995	23.899				Accepted
Within	202	48,626.053	240.723				

TABLE XV

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LISTENING TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings		Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N	8	9	4	3	10
	Sums	454	519	226	170	529
	SS	25,900	30,297	12,810	9,666	29,009
	$\bar{X}$	56.75	57.66	56.50	56.55	52.90
	ss	135.500	368.000	41.000	32.667	1,024.900
Social Sciences & Business Administration	N	6	4	6	2	19
	Sums	329	209	341	122	984
	SS	18,103	11,197	19,479	7,444	51,882
	$\bar{X}$	54.83	52.25	56.83	61.00	51.78
	ss	62.833	276.750	98.833	2.000	921.158
Humanities	N	11	5	9	8	22
	Sums	610	272	496	439	1,159
	SS	34,328	14,970	27,738	24,277	61,725
	$\bar{X}$	55.45	54.40	55.11	54.87	52.68
	ss	500.727	173.200	402.889	186.875	666.773
Agriculture	N	2	6	4	8	6
	Sums	100	299	192	420	314
	SS	5,072	15,295	9,322	22,448	16,548
	$\bar{X}$	50.00	49.83	48.00	52.50	52.33
	ss	72.000	394.833	106.000	398.000	155.33
Unclassified	N	5	6	3	2	11
	Sums	265	320	147	118	582
	SS	14,083	17,090	7,259	6,980	31,122
	$\bar{X}$	53.00	53.33	49.00	59.00	52.90
	ss	38.000	23.333	56.000	18.000	328.909
Miscellaneous	N	7	7	6	7	26
	Sums	329	379	318	417	1,402
	SS	15,837	20,703	17,114	24,943	76.704
	$\bar{X}$	47.00	54.14	53.00	59.57	53.92
	ss	110.000	182.857	260.000	101.714	1,103.846

TABLE XV A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Major Groupings	5	493.015	98.603	2.428	2.26	3.11	Rejected
Groups	4	454.737	113.684	2.800	2.41	3.41	Rejected
Interaction	20	693.034	34.651				Accepted
Within	202	8,202.930	40.608				

TABLE XVI

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY RELATED COLLEGE MAJORS

Major Groupings		Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N	8	9	4	3	10
	Sums	254	319	141	113	347
	SS	8,230	11,779	5,005	4,357	12,367
	$\bar{X}$	31.75	35.44	35.25	37.66	34.70
	ss	165.500	472.222	34.750	100.667	326.100
Social Sciences & Business Administration	N	6	4	6	2	19
	Sums	176	151	220	76	603
	SS	5,582	5,785	8,568	2,986	20,369
	$\bar{X}$	29.33	37.75	36.66	38.00	31.73
	ss	419.33	84.750	501.333	98.000	1,231.684
Humanities	N	11	5	9	8	22
	Sums	338	149	307	275	710
	SS	10,790	4,587	10,825	9,617	23,946
	$\bar{X}$	30.72	29.80	34.11	34.37	32.27
	ss	404.182	146.800	352.889	163.875	1,032.364
Agriculture	N	2	6	4	8	6
	Sums	51	174	117	245	188
	SS	1,341	5,386	3,487	7,653	6,046
	$\bar{X}$	25.50	29.00	29.25	30.62	31.33
	ss	40.500	340.000	64.750	149.875	155.333
Unclassified	N	5	6	3	2	11
	Sums	125	153	91	62	372
	SS	3,273	4,013	2,793	2,050	13,634
	$\bar{X}$	25.00	25.50	30.33	31.00	33.81
	ss	148.000	111.500	32.667	128.000	1,053.810
Miscellaneous	N	7	7	6	7	26
	Sums	201	221	175	251	903
	SS	5,793	7,191	5,219	9,127	32,771
	$\bar{X}$	28.71	31.57	29.17	35.86	34.73
	ss	21.429	213.714	114.833	126.857	1,409.115

TABLE XVI A

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Major Groupings	5	846.394	169.278	3.545	2.26	3.11	Rejected
Groups	4	641.917	160.497	3.361	2.41	3.41	Rejected
Interaction	20	475.459	23.773				Accepted
Within	202	9,644.658					

TABLE XVII

SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE IOWA READING TEST WHEN GROUPED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational-Professional Plans		Group A	Group B	Group C	Group D	Group E
Teaching	N	17	15	16	12	30
	Sums	3,221	2,805	2,927	2,244	5,535
	SS	612,453	525,323	538,867	421,018	1,026,653
	$\bar{X}$	189.47	187.00	182.93	187.00	184.50
	ss	2,168.235	788.000	3,408.938	1,390.000	5,445.500
Professions, Private business, self-employed & Government	N	8	3	3	3	22
	Sums	1,429	580	581	566	4,035
	SS	257,435	112,158	112,973	107,138	745,173
	$\bar{X}$	178.62	193.33	193.66	188.66	183.40
	ss	2,089.875	24.667	452.667	352.667	5,117.318
Housewife, Travel & Undecided	N	10	13	8	9	28
	Sums	1,868	2,365	1,504	1,689	5,116
	SS	349,686	432,623	283,962	318,245	938,974
	$\bar{X}$	186.80	181.92	188.00	187.66	182.71
	ss	743.600	2,374.923	1,210.000	1,276.000	4,207.714
Miscellaneous	N	3	5	3	2	7
	Sums	559	948	565	398	1,330
	SS	104,323	180,152	106,557	79,234	253,070
	$\bar{X}$	186.33	189.60	188.33	199.00	190.00
	ss	162.667	411.200	148.667	32.000	370.000

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variance	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Plans	3	466.052	155.350				Accepted
Groups	4	478.751	119.687				Accepted
Interaction	12	1,402.474	116.872				Accepted
Within	197	32,174.638	163.323				

TABLE XVIII

SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational-Professional Plans		Group A	Group B	Group C	Group D	Group E
Teaching	N	17	15	16	12	30
	Sums	1,200	1,115	1,163	810	2,158
	SS	87,442	84,639	86,923	56,960	161,504
	$\bar{X}$	70.58	74.33	72.68	67.50	71.93
	ss	2,736.118	1,757.333	2,387.438	2,285.000	6,271.867
Professions, Private business, Self-employed & Government	N	8	3	3	3	22
	Sums	539	269	238	254	1,628
	SS	37,515	24,161	19,330	21,908	126,036
	$\bar{X}$	67.37	89.66	79.33	84.66	74.00
	ss	1,199.875	40.667	448.667	402.667	5,564.000
Housewife, Travel & Undecided	N	10	13	8	9	28
	Sums	634	806	545	639	1,862
	SS	41,484	53,408	39,215	49,223	130,248
	$\bar{X}$	63.40	62.00	68.12	71.00	66.50
	ss	1,288.400	3,436.000	2,086.875	3,854.000	6,425.000
Miscellaneous	N	3	5	3	2	7
	Sums	188	325	185	148	553
	SS	12,510	22,935	11,441	11,152	45,759
	$\bar{X}$	62.66	65.00	61.66	74.00	79.00
	ss	728.667	1,810.000	32.667	200.000	2,072.000

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Plans	3	2,719.419	906.473	3.965	2.65	3.88	Rejected
Groups	4	984.349	246.087	1.076	2.41	3.41	Accepted
Interaction	12	2,617.569	218.131				Accepted
Within	197	45,027.241	228.564				

TABLE XIX

SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational-Professional Plans		Group A	Group B	Group C	Group D	Group E
Teaching	N	17	15	16	12	30
	Sums	918	846	862	663	1,593
	SS	50,616	48,098	47,166	36,947	85,649
	$\bar{X}$	54.00	56.40	53.87	55.25	53.10
	ss	1,044.000	383.600	725.750	316.250	1,060.700
Professions, Private Business, Self-employed & Government	N	3	3	3	3	22
	Sums	430	172	171	178	1,172
	SS	23,342	9,880	9,809	10,602	63,638
	$\bar{X}$	53.75	57.33	57.00	59.33	53.27
	ss	229.500	18.667	62.000	40.667	1,202.364
Housewife, Travel & Undecided	N	10	13	8	9	28
	Sums	512	680	417	515	1,439
	SS	26,386	36,398	22,035	29,597	75,449
	$\bar{X}$	51.20	52.30	52.12	57.22	51.39
	ss	171.600	828.769	298.875	127.556	1,494.679
Miscellaneous	N	3	5	3	2	7
	Sums	171	265	172	108	407
	SS	9,843	14,419	9,902	5,840	23,711
	$\bar{X}$	57.00	53.00	57.33	54.00	58.14
	ss	96.000	374.000	40.667	8.000	46.857

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Plans	3	199.972	66.657	1.532	2.65	3.88	Accepted
Groups	4	96.246	24.061				Accepted
Interaction	12	358.897	29.908				Accepted
Within	197	8,570.501	43.505				

TABLE XX

SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational-Professional Plans		Group A	Group B	Group C	Group D	Group E
Teaching	N	17	15	16	12	30
	Sums	520	473	517	416	1,002
	SS	16,354	15,299	17,359	14,764	34,768
	$\overline{X}$	30.58	31.53	32.31	34.66	33.40
	ss	448.118	383.733	653.438	342.667	1,301.200
Professions, Private business, Self-employed & Government	N	8	3	3	3	7
	Sums	222	111	109	94	254
	SS	6,292	4,361	4,163	2,986	9,620
	$\overline{X}$	27.75	37.00	36.33	31.33	36.28
	ss	131.500	254.000	202.667	40.667	403.429
Housewife, Travel & Undecided	N	10	13	8	9	28
	Sums	276	388	273	288	905
	SS	8,196	12,168	9,655	9,498	30,911
	$\overline{X}$	27.60	29.84	34.12	32.00	32.32
	ss	578.400	587.692	338.875	282.000	1,660.107
Miscellaneous	N	3	5	3	2	7
	Sums	97	190	101	68	254
	SS	3,267	7,460	3,419	2,344	9,620
	$\overline{X}$	32.33	38.00	33.66	34.00	36.28
	ss	130.667	240.000	18.667	32.000	903.429

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F_{05}	F_{01}	Hypothesis
Plans	3	205.623	68.541	1.383	2.65	3.88	Accepted
Groups	4	351.469	87.867	1.772	2.41	3.41	Accepted
Interaction	12	310.123	25.843				Accepted
Within	197	9.763.291	49.559				